

Application No. 10/722,685  
Amendment dated November 6, 2006  
Reply to Office action of June 5, 2005

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1                   Claim 1 (previously presented): An apparatus for thermally treating at  
2 least one intervertebral disc, comprising:  
3                   (a) an energy application head having an energy application region  
4                   and a tissue protecting region;  
5                   (b) a rounded edge intersection between said energy application  
6                   region and said tissue protecting region;  
7                   (c) at least part of said rounded edge intersection being a thin leading  
8                   edge;  
9                   (d) said tissue protecting region being sloped from said thin leading  
10                  edge to a thick region for lifting vulnerable tissues away from a site  
11                  of energy application to said at least one intervertebral disc; and  
12                  (e) a control member operationally connected to said energy  
13                  application head, said control member suitable for controlling said  
14                  energy application head during treatment of said at least one  
15                  intervertebral disc.

16  
1                   Claim 2 (original): The apparatus of claim 1, wherein said energy  
2 application head is wedge-shaped.

3  
1                   Claim 3 (original): The apparatus of claim 1, wherein said tissue  
2 protecting region has a domed center.

1                   **Claim 4 (original):** The apparatus of claim 1, wherein said energy  
2 application region has a smooth surface suitable for gliding over surfaces of an annulus  
3 fibrosis without snagging other tissues.

4

1                   **Claim 5 (original):** The apparatus of claim 1, said energy application head  
2 further comprising at least one instrument selected from the group consisting of:

3                   (a) a temperature measuring instrument;  
4                   (b) a tissue visualizing instrument  
5                   (c) an energy measuring instrument;  
6                   (d) a distance measuring instrument;  
7                   (e) an area measuring instrument;  
8                   (f) a pressure measuring instrument; and  
9                   (g) a volume measuring instrument.

10

1                   **Claim 6 (original):** The apparatus of claim 1, said energy application head  
2 further comprising at least one energy applicator selected from the group consisting of:

3                   (a) a laser;  
4                   (b) a fiber-optic strand;  
5                   (c) a lens;  
6                   (d) an electrode;  
7                   (e) a wire;  
8                   (f) a light bulb;  
9                   (g) a heating element; and  
10                  (h) an ultrasound transducer.

11

12

1                   **Claim 7 (original):** The apparatus of claim 1, wherein said energy  
2 application head applies energy selected from the group consisting of:

3                   (a) electric current;  
4                   (b) radio frequency waves;  
5                   (c) microwaves;  
6                   (d) infrared waves;  
7                   (e) visible light waves;  
8                   (f) ultraviolet waves;  
9                   (g) ultrasonic sound waves; and  
10                  (h) conductive thermal energy.

11  
1                   **Claim 8 (original):** The apparatus of claim 7, said energy further  
2 comprising energy in a form selected from the group consisting of:

3                   (a) incoherent electromagnetic radiation;  
4                   (b) defocused laser energy; and  
5                   (c) collimated laser energy.

6  
1                   **Claim 9 (original):** The apparatus of claim 1, said tissue protecting region  
2 further comprising at least one thermal protector for protecting vulnerable tissues from  
3 energy applied by said energy application head.

4  
1                   **Claim 10 (original):** The apparatus of claim 9, wherein said at least one  
2 thermal protector is selected from the group consisting of:

3                   (a) at least one layer of insulation;  
4                   (b) airflow coolant;  
5                   (c) liquid coolant;  
6                   (d) coolant from a refrigeration system;  
7                   (e) a thermocouple; and  
8                   (f) a heat-pipe.

9  
1                   Claim 11 (original): The apparatus of claim 1, said control member further  
2 comprising at least one member selected from the group consisting of:

3                   (a) a wire;  
4                   (b) a fiber-optic strand;  
5                   (c) one or more hollow tubes;  
6                   (d) a radio control mechanism;  
7                   (e) a moving mechanical link; and  
8                   (f) a beam of light;  
9                   (g) a lumen for adding and removing instruments;  
10                   (h) a lumen for adding and removing tissue; and  
11                   (i) a lumen for irrigating.

12  
1                   Claim 12 (previously presented): An apparatus for thermally treating at  
2 least one intervertebral disc, comprising:

3                   (a) an energy application head having an energy application region  
4                   and a tissue protecting region;  
5                   (b) a thin leading edge formed at the anterior portion of a rounded  
6                   edge intersection between said energy application region and said  
7                   tissue protecting region;  
8                   (c) said tissue protecting region being sloped away from said energy  
9                   application region and from said thin leading edge to a thick region  
10                   for lifting vulnerable tissues away from a site of energy application  
11                   to said at least one intervertebral disc; and  
12                   (d) a control member operationally connected to said energy  
13                   application head, said control member suitable for controlling said  
14                   energy application head during treatment of said at least one  
15                   intervertebral disc.

16

1                   Claim 13 (original): The apparatus of claim 12, wherein said energy  
2 application head is wedge-shaped.  
3

1                   Claim 14 (original): The apparatus of claim 12, wherein said tissue  
2 protecting region has a domed center.  
3

1                   Claim 15 (original): The apparatus of claim 12, wherein said energy  
2 application region has a smooth surface suitable for gliding over surfaces of an annulus  
3 fibrosis without snagging other tissues.  
4

1                   Claim 16 (previously presented): An apparatus for thermally treating at  
2 least one intervertebral disc, comprising:

- 3                   (a) an energy application head having an energy application region  
4                   and a tissue protecting region;
- 5                   (b) a thin leading edge formed at the anterior portion of a rounded  
6                   edge intersection between said energy application region and said  
7                   tissue protecting region;
- 8                   (c) said tissue protecting region being sloped away from said energy  
9                   application region and from said thin leading edge to a thick region  
10                  for lifting vulnerable tissues away from a site of energy application  
11                  to said at least one intervertebral disc.

12                  Claim 17 (original): The apparatus of claim 16, wherein said energy  
1 application head is wedge-shaped.  
2

3                  Claim 18 (original): The apparatus of claim 16, wherein said tissue  
1 protecting region has a domed center.  
2

Application No. 10/722,685  
Amendment dated November 6, 2006  
Reply to Office action of June 5, 2005

1                   Claim 19 (original): The apparatus of claim 16, wherein said energy  
2 application region has a smooth surface suitable for gliding over surfaces of an annulus  
3 fibrosis without snagging other tissues.

4

1                   Claim 20 (previously presented): An apparatus for thermally treating at  
2 least one intervertebral disc, comprising:

3                   (a) an energy application head having an energy application region  
4 and a tissue protecting region;

5                   (b) a control member operationally connected to said energy  
6 application head, said control member suitable for controlling said  
7 energy application head during treatment of said at least one  
8 intervertebral disc;

9                   (c) said energy application head further comprising a rounded thin  
10 leading edge at the anterior intersection of said energy application  
11 region and said tissue protecting region; and

12                   (d) said tissue protecting region sloped away from said energy  
13 application region and to a thick region for lifting vulnerable tissues  
14 away from a site of energy application to said at least one  
15 intervertebral disc.

16

1                   Claim 21 (original): The apparatus of claim 20, wherein said energy  
2 application head is wedge-shaped.

3

1                   Claim 22 (original): The apparatus of claim 20, wherein said tissue  
2 protecting region has a domed center.

3

1                   Claim 23 (original): The apparatus of claim 20, wherein said energy  
2 application region has a smooth surface suitable for gliding over surfaces of an annulus  
3 fibrosis without snagging other tissues.

4  
1                   Claim 24 (previously presented): A method for epidurally treating at least  
2                   one intervertebral disc using a disc refurbisher, said method comprising the steps of:  
3                   (a)       gaining access to a vertebral column;  
4                   (b)       inserting a thin leading edge formed at the anterior portion of a  
5                   rounded edge intersection between an energy application region  
6                   and a tissue protecting region of an energy application head of said  
7                   disc refurbisher;  
8                   (c)       epidurally approaching the posterior aspect of said at least one  
9                   intervertebral disc;  
10                  (d)       lifting vulnerable tissues using said tissue protecting region, said  
11                  tissue protecting region being sloped away from said energy  
12                  application region and from said thin leading edge to a thick region;  
13                  and  
14                  (e)       applying energy to a posterior aspect of said at least one  
15                  intervertebral disc using said energy application region.  
16

1                   Claim 25 (previously presented): A method for thermally treating an  
2                   intervertebral disc while thermally protecting vulnerable tissues, said method comprising  
3                   the steps of:  
4                   (a)       providing a disc refurbisher, said disc refurbisher comprising:  
5                   (i)       an energy application head having an energy application  
6                   region and a tissue protecting region;  
7                   (ii)      a thin leading edge formed at the anterior portion of a  
8                   rounded edge intersection between said energy application  
9                   region and said tissue protecting region;  
10                  (iii)     said tissue protecting region being sloped away from said  
11                  energy application region and from said thin leading edge to  
12                  a thick region for lifting vulnerable tissues away from a site of

energy application to said at least one intervertebral disc;

and

- (iv) a control member operationally connected to said energy application head, said control member suitable for controlling said energy application head during treatment of said intervertebral disc;

(b) gaining access to a vertebral column;

(c) epidurally approaching the posterior aspect of said at least one intervertebral disc using said control member to position said energy application head;

- (d) evaluating an extent of disc injury and calculating an amount of energy needed to thermally refurbish said at least one intervertebral disc;

(e) applying energy using said disc refurbisher to a posterior aspect of said at least one intervertebral disc while maintaining a safe temperature in said vulnerable tissues near said at least one intervertebral disc;

(f) monitoring an amount of energy delivered and a temperature in said vulnerable tissues near said at least one intervertebral disc;

(g) observing and evaluating an amount of shrinkage and strengthening of said at least one intervertebral disc to determine an intensity and duration of further energy delivery; and

(h) verifying that said shrinkage and strengthening of said at least one intervertebral disc is mechanically successful.